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Characterizing Thin Film Interface Disruption by X-rays YVES IDZERDA, JOHNATHON HOLROYD, JOE DVORAK, MARCO LIBERATI, Montana State University, ELKE ARENHOLZ, The Advanced Light Source, SHANE STADLER, Southern Illinois University — Transition metal based alloys of $La_xSr_{1-x}TMO_3$ films (TM=Co, Fe, Mn) have been grown by pulsed laser deposition (PLD) on substrates of varied lattice mismatches to examine the effects of strain on the film properties. Strain is introduced into these systems by depositing overlayers of varying thickness (wedges) and lattice mismatch to vary stress at the upper interface of these films. The interfacial region of these films is probed by X-ray absorption spectroscopy (XAS), X-ray Magnetic Circular Dichroism (XMCD), and X-ray Resonant Magnetic Scattering (XRMS) to characterize the interfacial disruption in this region in an element-specific, site-specific manner with magnetic contrast. These experiments show that the response of the multi-element films is to modify the chemical (and magnetic) composition of these films in the interfacial region to accommodate the stress. The XAS, XMCD, and XRS data show that in each case, the response to compressive or tensile interfacial strain is to modify the concentration of La and Sr in the interfacial by La diffusion to/away from the interface.

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